

CONSTRUCCIÓN DEL CONOCIMIENTO EDUCATIVO: ESTUDIOS EMPÍRICOS, EXPERIENCIAS Y ANÁLISIS TEÓRICO

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EDITORIAL
DYKINSON

Construcción del conocimiento educativo: estudios empíricos, experiencias y análisis teórico

María Soledad Villarrubia Zúñiga, Paula González García,
Leyre Alejaldre Biel y Antonio Martínez-Arboleda

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Madrid, 2025

Editorial DYKINSON, S.L.
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Teléfono (+34) 915442846 - (+34) 915442869
e-mail: info@dykinson.com
<http://www.dykinson.es>
<http://www.dykinson.com>

ISBN: 979-13-7006-691-8
DOI: <https://doi.org/10.14679/4407>

Preimpresión:
New Garamond Diseño y Maquetación, S.L.

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Rethinking architectural education: uncertainty, error and laziness as (unexpected) learning assets for creativity

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DOI: <https://doi.org/10.14679/4451>

Abstract: This chapter examines current architectural education, identifies the paradoxical relationship between teaching and learning, and draws on interdisciplinary research about the disconnection between instructive creative ideals and student's insufficiencies in design responses. Recognizing the need for a reconceptualization of educational matters that improve imagination and cognitive engagement, this chapter proposes a theoretical foundation for innovative design thinking, from which it is possible to apply assets such as a) “uncertainty” as a constructive impostor agent that questions established beliefs and holds imagination; b) “error” reframed as a positive generative device that leads to unique solutions and enhance learning; c) “laziness” as a material subtraction force that simplifies overly complex systems and encourages critical reflection. Architectural education is, therefore, relocated as a dynamic, student-centred practice attuned to the complexity, ambiguity, and demands of an unpredictable era. Ultimately, constraints on implementing those assets are identified, such as the risk of student disorientation, difficulties in assessment, and potential conflicts with standards, admitting that a balance is necessary between freedom and structure, suggesting that inventiveness can thrive within flexible boundaries while maintaining academic integrity.

Keywords: inventiveness, conceptual ideation, pedagogical reconfiguration, transformative knowledge.

1. INTRODUCTION

In architectural education, there is an increasing need to rethink traditional narratives by accepting *uncertainty*, *error*, and even *laziness* - not as inadequacies of learners in scholarship contexts but as valuable phenomena that can help them deepen, refine, or simplify ideas during imaginative processes, ultimately improving learning effects.

Older and conventional educational theories often stated a sort of ‘Cartesian’ vision that prioritized order, precision, and infallibility in how knowledge was transmitted, acquired and applied, and while this style has provided a stable foundation, it fails in addressing today’s educational challenges, such as the decline in student motivation leading to inefficiency on creativity skills – essential in architecture. Therefore, it is important to adopt a broader view of teaching and student performances, especially during the initial phases of architectural ideation and understanding.

When students make ‘mistakes’, it does not always imply personal incapacity or system failure. However, the distress caused by the ‘unknown’ at the beginning of the creation tasks, builds complex tensions between teachers and students, manifesting both as fear of acting and fear of inaction, but these concerns are fortunately met by a productive counterbalance and restlessness that can oppose apathy.

It is important to emphasize a) the exploration of *uncertainty* as a source of innovation and inquiry, which can lead students to unique intellectual and material outcomes; b) embracing *error* as a learner's resource for rethinking architectural languages and models; and c) using *laziness* as a behavioural mechanism that is opposable for ineffectiveness and encourages detachment to simplify complex design processes.

Acknowledging and engaging with such so-called 'malignant' concepts can support good progress in imagination processes, encourage a more authentic commitment to reality, and improve the originality of outcomes. This perspective also calls for the reinvention of teaching methods and cultural change within academia, encouraging educators and researchers to accept fallibility and explore alternative informative approaches that can turn weaknesses into affirmative instruments.

Recent revisions have focused on the productive role of flaws in architectural education, challenging the established 'obsession' with exactness, rigour, and predictability.

There seems to be a shift in the mindset of educationalists, showing a more tolerant and helpful attitude toward failure - one that reflects the unpredictable nature of reality - to address students' disengagement more effectively.

By recognizing the paradoxical relationship between teaching and learning, this chapter addresses the need for a reconceptualization of educational matters that improves the imagination and cognitive engagement of students, holds the potential to stimulate unprecedented creative outcomes, and prepares them for contingencies in architectural practice, which is later synthesized in a theoretical framework proposed as a work basis for educators' guidance.

1.1. Background

Educational methods have moved from strict teaching to more flexible and experimental approaches that connect better, today, with social and cultural realities and students' capacities and abilities.

The Beaux-Arts educational system, which dominated the 18th and 19th centuries, focused on formal drafting referenced in historical styles, often criticized for valuing aesthetics over practical modernisation. Later, Bauhaus introduced a system combining art, craft, and technology and promoting hands-on learning through teamwork, which laid the substance for modernist architecture that prevailed until the middle of the last century. However, it faced criticism for overlooking local culture and latent social aspects. In response, postmodern education brought back pluralism, historical awareness, and user-focused design, therefore challenging the universal idea of technocracy.

Today's architectural education blends all backgrounds but still struggles with encouraging true creativity in students' routines. More recently, there has been growing recognition that flaws, once understood as problems, can spark improvement and deeper learning (Silberberger, 2022). Mistakes are now viewed not as strict personal failures but as creative opportunities to rethink ideas and expand how learners design, pushing back against older models that prioritize control and certainty, and treating students as passive learners (Freire, 2017).

2. ARCHITECTURAL EDUCATION IN TRANSFORMATION

2.1. Teaching and learning paradox

The relationship between teaching and learning is characterized by a complex and often contradictory dynamic. Learning is commonly assumed to rely on conditions that contradict the traditional notion of knowledge acquisition.

For a long time, it was assumed that there was a direct correlation between the teaching content and learning consequences. Still, a persistent inconsistency remains - teaching does not always lead to learning, and learning can occur without formal teaching, which tests conventional educational assumptions and has significant implications for how education is understood and practised (Crawford & Thomas, 2018).

If teaching does not always result in meaningful learning, particularly when it fails to support learners' needs or context, this conviction must be confronted when developing more effective educational practices and procedures to address contemporary issues in higher education. Nonetheless, although teachers are encouraged to adopt new constructivist pedagogical methods, their personal beliefs and entrenched traditional practices can clash with these reforms. High expectations, institutional inertia, inadequate infrastructure, and a lack of alignment between investigation and teaching practices can further impede active learning, thus complicating teaching-learning dynamics (Børte et al., 2020).

2.1.1. Disengagement fissures

When expectations do not meet the realities of educational practices, structural fissures emerge, which manifest as reduced motivation, for both teachers and students and superficial learning. Trusting that genuine learning occurs not through meeting expectations but by disrupting them, rather than indicating failure, these moments of dissonance can be essential for effective learning.

A systematic analysis of studies on student expectations found divergences between what they anticipated and the reality of universities, which undermine academic success. It has been argued that students' beliefs shaped by their previous schooling experiences and narratives, clash with the demands of higher education, leading to feelings of inadequacy (Hassel et al. 2018).

By observing teacher principles and warning against the assumption that high expectations are beneficial (Rubie-Davies & Hattie, 2024), it is claimed that when teachers' expectations are unrealistic, they can lead to student demoralization, mostly if they perceive the standards set by teachers as unattainable, continuing a cycle of withdrawal and underperformance.

Rigid positions by teachers accentuate the need to rethink educational models during the creative stages of design when learning involves navigating ambiguity and complexity. Indeed, a teacher, as an authoritative instructor who transfers static knowledge, must give way to a more organic position where emotional fluctuations and imperfect responses are not only expected but also recognized as essential. Humility is also decisive for more inclusive and adaptive pedagogy, as educators must recognize the limits of instructional control and accept that learning is not always linear or predictable.

This rethinking must consider the resources available to both educators and students to cultivate a more natural and learner-centred educational paradigm. Instead of idealizing error-free and direct teaching-learning demands, educational practice should acknowledge the profitable potential of the 'erratic' or the 'imperfect' as actual active mediators which can have an optimistically impactful role in creative processes.

3. REIMAGINING ARCHITECTURAL CONCEPTS IN PEDAGOGY

Although the literature on the described themes still reveals controversy, fragmentation, and underdevelopment, there is an explicit growing consensus on some provocative concepts within a more adaptive learning environment, such as facilitating the development of methodologies that promise more comprehensive, adaptable, and

effective teaching practices essential for reevaluating so-called bad concepts as potential gateways to alternative outcomes (Silberberger, 2022). This demands a conscious effort by teachers to reframe and explore these concepts from unconventional perspectives, such as addressing the common fear of *uncertainty* among students when faced with specific instructions or assignments, particularly their tendency to become immobilized by the task of making ‘virtuous’ design ideas. When properly understood, the reluctance to accept *uncertainty* can uncover the underlying processes that are genuinely beneficial for design thinking. On the other hand, *errors* should not merely be seen as flaws to avoid or correct; they can serve as productive tools for originality as a reproductive mechanism rather than just occurrences that require amendments. Additionally, what is often perceived as *laziness*, typically linked to students’ reluctance to engage in the development of architectural ideas, might represent a pause that allows for reconsideration. These moments of confusion, failure and ‘stopping’ can facilitate critical reflection, enabling students to use it as valuable strategic tools and resources.

To implement such a reconceptualization in architectural education addressing these three assets of inventiveness skills, a foundational pedagogical frame is theorized to incorporate the concepts of *uncertainty*, *error*, and *laziness* as active elements in design teaching and learning processes, as follows: a) Tool 1- Image/idea catalyst: by guiding students through the ambiguity and deviations inherent in their first thought processes when asked to answer an initial architectural problem, they should develop a tolerance for complexity, enhance their critical inquiry, and learn to frame their design questions by exploring multiple solutions within an interplay between visible and invisible fields. This is achieved using the concept of *uncertainty* as a *constructive impostor agent* that helps to check established imagery beliefs and raises profound imagination, ultimately questioning assumed certainties; b) Tool 2 - Experimental failure: students should then be encouraged to document and analyse unsuccessful strategic ideas and trace the emergence of flaws in representational attempts by mental drawing (some physical drawing can also occur at this stage, according to the teacher’s methodology). This practice not only helps avoid unrestricted repetition but also uncovers new possibilities and unexpected solutions that arise from the identification of casual *errors* or the introduction of intentional *errors*. Such an error-based method can serve as a *positive generative tool* that supports the development of unique solutions to common design problems; c) Tool 3 - Productive hesitation as reflexive subtraction: finally, students may be invited to pause and reassess strategies and design solutions before proceeding to the final stages of the project. This reflective space (free drawing through diagrams) legitimizes a slower and more deliberate progression, promoting deeper engagement with more conceptual clarity and material simplification. What might be perceived as *laziness* can then become a moment for critical recalibration, acting as a *material subtraction force* that simplifies previous maximalist systems.

By integrating these three principles into curricula, it is believed that students can be steered to reinterpret common personal and collective tasks and issues in the creative stage, as conceivable outcomes. The intention is to nurture inclusiveness, enhance self-awareness, and promote autonomy and depth in design work, as this approach ultimately seeks to produce more resilient and original architectural outcomes by deconstructing the faulty perception of what constitutes effective conceptual assets or tools for architectural design skills.

3.1. Uncertainty – constructive ‘impostor’ agent

Images form the foundation of imaginative thought in architecture, as well as in other academic fields where creativity and inventiveness are vital, serving as the primary medium through which students generate and convey ideas mentally.

Architectural students depend on mental images to develop initial concepts, which are then transformed into drawings and other types of material representation, leading to effective design meetings with the project or assignment.

The creation and manipulation of images are intertwined not only with objective observation and memory but also with unpredictable emotional and sensitive dimensions that occur in an almost ‘blind’ state, imposing a subjective analysis that prioritizes cerebral imagery toward uniqueness and peculiarity, before conscious cognition and direct delivery (Neto & Fernandes, 2014). In this context, images are known to operate on two interdependent planes: the internal, 'blind' and 'mute' mental image, and the external, empirical plane that ‘speaks’ to matter and consists of its representation (and modification).

Central to the described situation is the notion of visuality, which explores the dialectic between the invisible and visible dimensions within the imagination, suggesting an intermediary or transitional land - a space conducive to creative bewilderment - for the creation of distinctive ideas. The action of the 'third eye' - a metaphor for this almost unconscious or, at least, unpredictable configuration territory - facilitates the emergence of unique concepts by comprising intangible uncertainties that later raise improvement. Between image and non-image, representation and non-representation and within this liminal domain, incorporeal visual elements are distant from the empirical certainties of memory, or the real visions obtained from eye-seeing, yet close to dreams, enabling a creative and prolific tension between abstraction and final figuration.

This perspective contests traditional architectural pedagogy, which reduces drawing to physical representational skills, based solely on direct observation. By assuming and using image power as a fruitful agent, students can profusely engage with mental drawing to access primarily but more operatively strategies that surpass conventional representational practice.

All these processes are based on the *uncertainty* of thought as if the instruction for the design is ignored at some point, thus, the element of *uncertainty* can function as a tool and supply for re-evaluating architectural systems and models. This profound mental exercise is linked to a sort of blank drawing practice, where the mental field preceding material expression can intersect with more inventive and artistic domains.

The blank drawing strategy embodies a cognitive transitional space in which matter and line dissolve through mental continuity and potentiality, demanding pedagogical integration to harness imaginative power (Neto, 2025). At this stage, no physical drawing has been produced, allowing students to immaterially guide ambiguity, chance, and change.

It is believed that this approach can inspire students to explore multiple solutions, rather than just one, using reflective journaling on sensory responses, and to better prepare for the next stage of choosing features in the design process.

3.2. Error – positive generative device

Errors are not only unavoidable but also act as facilitators for reflection, experimentation, and discovery. This positive *error* connotation is aligned with the concept of deep thinking, in which practitioners learn and progress through recursive problem-solving and

reassessment of their ‘certain’ assumptions. Consequently, architectural educators can harness student *errors* as valuable learning opportunities for creativity and critical judgment, which are key competencies for architects facing complex design trials (Lawson, 2005). This perspective resonates with contemporary constructivist learning theories that focus on the importance of active engagement and meaning production in knowledge acquisition (Zhang & Fiorella, 2022).

The attention to *error* originating from Aristotle’s early analysis of reasoning, which he termed “fallacy”, suggested that *error* should not be viewed merely as a deviation needing correction, but as a phenomenon with a more profound significance and impact. Since then and more recently, the understanding of *error* in education has developed beyond its conventional framing as a cognitive or procedural failure, emerging as a critical driver of both learning and creative ideation.

In educational psychology, it has been asserted that *errors* enhance memory consolidation, encourage active engagement and direct attention toward conceptual clarification (Finn, 2011; Metcalfe, 2017). When applied to the architectural domain, such theories underline the value of *error* as a relevant methodological and conceptual resource in design pedagogy and practice, based on the initial chaos that leads to the ultimate order. Moreover, in architectural design, *errors*, whether intentional, accidental, or systemic, have been increasingly redefined as procreative forces capable of disrupting normative formal systems and revealing latent spatial potential. This reframing is evident when it is argued that *error* is a form of creative rupture, cancelling out conventional pathways, and opening alternative representations (Neto & Fernandes, 2014). Within architectural drawing, as the authors emphasized, omissions and unresolved gestures do not signify failure, but rather instigate a domain of possibilities where abstraction and indeterminacy allow for optimal conceptual advents. The indeterminate conditions that evolve drawing invite iterative speculation, destabilize fixed meanings and enable students to explore unexpected aesthetic, spatial, and material outcomes.

Collectively, interdisciplinary positions suggest the benefits of a reorientation of architectural pedagogy from the enclosed logic of control and correction to a more productive (irregular) and open-ended one. The *error* must not merely be tolerated but theorized and applied as an essential operative category - one that provokes critical inquiry, engenders novel formal languages, and enriches the cognitive ecology of architecture that, in this light, errancy becomes an asset, method, and material.

3.3. Laziness – material subtraction force

There has been an increasing re-evaluation of concepts traditionally viewed negatively, such as *laziness*, as potential catalysts for creative productivity. Contrary to technocratic beliefs that equate complexity with sophistication and precision with quality, emerging perspectives in architectural design theory, pedagogy, and artistic inquiry, are increasingly advocating procedures rooted in strategic simplicity and diagrammatic thinking that engage with ‘lazy’ premises toward creating order and simplification in the results of the previous stages of design (ideation).

The change begins with the notion of the ‘good lazy’ student (Bryson & Hand, 2007), who, in some way, during the development of the projects, starts to resist the overproduction of form and rejects over-architecting in favour of pragmatic, streamlined, and maintainable solutions. Rather than indicating apathy or disengagement, this form of *laziness* may serve, after the formal paraphernalia of the first steps of ideation work and after refining the concepts that lead to the materialization of ideas, as a critical filter that examines necessity, clarity, and user-centred efficiency.

The concept of *laziness* is later introduced to examine *uncertainty* and *error* assignments, as its deferred application allows for a more nuanced refinement of beliefs and the necessary development of targeted solutions to initial project problems.

From a representational standpoint, this ethos of simplicity finds powerful expression through diagrammatic drawings. The diagram - not merely a visual summary (final interpretation) but a dynamic field of potentialities (filtered formation) - rejects linear or hierarchical design logic and sponsors rupture as a productive disturbance that ultimately leads to straightforwardness. Thus, the diagrammatic model, in these terms, becomes a space for subtraction exploration, where intuitive and formal forces interact to produce material configurations that are closer to a clear outcome. In this sense, the diagram parallels the type of evolutionary drawing in which expression emerges through latent formal intuitions, and which can be described as the morphology of a diagrammatic representation (Neto & Fernandes, 2014).

An architectural diagram is not simply an act of transcription but also a mode of inquiry, a gestural and cognitive interface where the student engages in speculative depiction experimentation, even before the act of final (formal) sketching. Through forms such as annotations, plans, schemas, tables, etc., depiction becomes a field of subtractive exploration, mediating between hand and mind, logic and perception, the known and the emergent. Here, the diagram acts not as a passive tool of representation but as an active reasoning agent, such as a synthetic infrastructural drawing (or what precedes effective drawing), cultivating polished abstract associations, and later, real configurations.

Ultimately, the architectural value of *laziness* lies in its capacity to resist or correct overproduction through diagram exercise as a pre-drawing and thinking-refining tool, offering a conceptual terrain that supports a methodological move from open-ended exploration to more deterministic problem-solving.

By legitimizing *error* first and supporting simplification afterwards, contemporary architectural pedagogy can reclaim a more critical, reflexive, and sustainable design spirit - one that prioritizes clarity without sacrificing complexity and invention, but, most of all, without abandoning architectural rigour.

Table 1. A theoretical framework for educators.

| Concept | Definition | Directions | Application | Tools | Benefits |
|---|---|---|---|---|--|
| <i>Uncertainty:</i> Constructive 'Impostor' Agents | Imagery basis for innovation and inquiry: Unpredictable or ambiguous elements for ideation and design processes, promoting creative tensions between abstraction and reality. | Navigate ambiguity and change of ideas, using open-ended exploratory approaches. Indorse creativity and adaptive problem-solving by emphasizing predefined answers. | Design Studio: Exploration of multiple images and solutions - interplay between the visible and invisible. Assignments: Iterative testing through deviant representation as an ongoing internal refinement. | Blank drawing (mental space prefiguration) Explore how perceptions can form before any program is introduced. Provoke uncertain concepts through intellectual images, using reflective journaling of sensory responses. | Dreamlike visual elements can positively question systems and models. Fosters novelty, inspiring to think outside conventional solutions. Adaptive thinking for dealing with complex problems. |
| <i>Error:</i> | Tool for rethinking | Critical thinking and | Auto/collective critique: | Multiplicative missteps: | Create resilience and growth as |

| | | | | | |
|--|--|--|---|--|---|
| Positive Generative Device | architectural languages and models: Intentional errors/mistakes in the ideation process, seen as opportunities for growth, inquiry, and inventiveness. | constructivist learning, accepting failure with a focus on how it can inform and improve concepts and first ideas. | Peer review that values iteration over perfection. Incorporation of errors found in ideation processes that can turn into inventive ideas. Error-production exercises: Recursive design (improvisation). Intentional errors in drawing to question and better explore outcomes. | Use intentional errors, glitches, or disruptions as a design-generation method to uncover spatial potentials. Disrupt normative systems, reassuring speculation; thus, errors become epistemic tools, promoting informal thinking and exploratory drawing. | students learn to accept failure as part of creative development. Enhance memory, focus attention, and conceptual understanding. Fights the fear of making mistakes. |
| <i>Laziness:</i> • Material Subtraction Force | Mechanism for detachment and simplification of design processes Resistant phenomena that simplify unnecessary complexity and find efficient solutions are pragmatically oriented. | Strategic approach to minimalism and proficiency. Boost students to question overcomplicated solutions and promote subtractive methods in design systems. | Synthesis analysis: Evaluation of whether solutions or parts are necessary without losing conceptual integrity. | Diagramatology: Engage in introspective, recursive diagramming ('infrastructural' schematic) to uncover nonlinear spatial narratives. Introspective mapping. Trace layering, recursive mark-making and loops. | Teaches how to prioritize rationality and clarity over complexity. Promote and refine chaotic ideas by reducing excess and extras. Question complexity to lessen over-architecture. |

4. CONSTRAINTS IN STATING 'NEGATIVE ENERGIES' AS BENEFICIAL RESOURCES

The integration of *uncertainty* factors as a focal tool in architectural education can enhance creativity and critical thinking by prompting students to direct ambiguities and tackle exploratory design tasks (Dorst, 2015). However, the absence of parameters and boundaries can lead to disorientation, resulting in insecurity and hesitation during the design process, complicating standardized assessment, as it carries doubts in evaluating student work within structures focused on measurable results. *Uncertainty* as an instrument risks project solution that, while conceptually innovative, may be challenging to implement because inherent ambiguity may delay effective outcomes, as unclear purposes can block shared understanding.

In addition, the intentional incorporation of *errors* in ideation phases, without restrictions, could lead to the normalization of inaccuracies in the forward stages of the design process, creating difficulties in differentiating between genuine exploration and a lack of effort.

Similarly, the misapplication of *laziness* devices may lead to the total avoidance of complexity, resulting in superficial or incomplete work.

The exposed risks are easily identifiable and recognizable, and ultimately, the success of the experimental pedagogies presented in this chapter depends on balancing freedom with structure.

While exploratory openness and inclusiveness are fundamental for promoting creativity, they must be situated within a solid pedagogical agenda that foresees and provides effective responses to curricula and measurable outcomes, since they thrive not in the absence of constraints but within adaptable margins while maintaining academic and professional integrity (Dym et al., 2019; Oxman, 2020).

5. SOLUTIONS, RECOMMENDATIONS AND DIRECTIONS

It is believed that the framework proposed in this chapter enables instructors to encourage risk-taking and conceptual depth while assuring the technical standards, communicative accuracy, and ethical responsibility of students.

Defining learning purposes, assessment criteria, and creating methodological scaffolding are key for guiding students through experimental design processes [such as those presented here], while ensuring the acquisition of core competencies (Dorst, 2015). In this context, experimental pedagogy should not be seen as conflicting with a controlled one but rather as a reconfiguration that accommodates multiplicity and values the conceptual stages of the design process alongside the final goals of design (Oxman, 2020). This balance is essential for preparing graduates to become critically engaged thinkers, capable of navigating the complex contemporary architectural landscape, along with curricula that must explicitly acknowledge the pedagogical value of *uncertainty*, *error*, and *laziness* not as mere indulgences, but as deliberate instruments to promote resilience and creative agency. However, alternative approaches, such as adaptive guidelines, insightful assortments, clear assessment models, and detailed process documentation, are needed to value failure revision as integral to learning (Biggs & Tang, 2011).

Further analyses are required to validate the aforementioned methods in educational settings, as pedagogy for change requires comprehensive development programs that equip teachers with the expertise to manage nonlinear learning while providing meaningful guidance.

Research tracking graduates can also offer deep insights into how such educational approaches influence adaptability and creative management (Oxman, 2020). Likewise, comparative analyses across institutions implementing varying degrees of these assets would help identify best practices and contextualization (Dym et al., 2019).

The sustainability of experimental architectural frameworks relies on their evolution into settings and assignments that stand in for fertile thought, not merely by eliminating constraints but through the intentional design of supportive structures that guide, assess, and nurture exploration. By approving this calibrated balance, architectural education can be effectively transformed while maintaining intellectual integrity and preparing students to address the multifaceted demands of contemporary professional contexts.

6. CONCLUSION

This chapter emphasizes the need for a transformational change in architectural pedagogical mindset, supporting the deliberate integration of *uncertainty*, *error*, and *laziness* as positive and productive factors in education, rather than the inconveniences of learners' performance.

Including *uncertainty* as a tool, it is believed that it can boost creative cognition by enabling engagement with ambiguous and open-ended design problems, thereby expanding students' exploratory capacity during the ideation phase.

Reframing *errors* as reflective mechanisms may be critical for imagining and conceptual development, eliciting immersive states and operative personal narratives in students.

Finally, the strategic welcoming of students' *laziness* can contribute to reducing dogmas and overproduction, thereby promoting efficiency, clarity, and sustainability in the design outcomes.

However, the fertile incorporation of these traditionally negative concepts as creative learning assets is partially contingent. Without articulated teaching goals, solid assessment protocols, and structured methodologies, there is a substantive risk of student confusion, normalizing inferior effort, and diminishing academic rigour. Therefore, both institutional support and further research are central to the development of programs, studio environments, and accreditation models. Comparative examination initiatives are also recommended to evaluate empirically the impact of these pedagogical premises on students' competency, creativity, and adaptability.

It is concluded that the success and sustainability of this kind of experimental architectural pedagogy depends on reconceptualizing limitations as enabling diverse parameters, by adopting a dialectical interplay between *uncertainty* and methodological rigour, *error* and reflective practice toward practical inventiveness, and *laziness* as a prolific filter, supporting graduates capable of critical inquiry and adaptive improvement in ideation and conceptual fields.

It is believed that the proposed reorientation holds the potential to transform architectural learning and practice, positioning fallibility and its derivations as vital resources for creativity while enhancing the discipline's capacity to respond to the multifaceted questions of contemporary society.

ENDNOTE

Despite the prerogative of the *mental drawing* along this chapter, the author does not position a resistance to material representation – particularly conventional *drawing* as an effective and essential practice – recognising it as fundamental and transversal to all architectural design developments and stages.

REFERENCES

- Biggs, J. & Tang, C. (2011). *Teaching for quality learning at university* (4th ed.). McGraw-Hill Education.
- Børte, K., Nesje, K. & Lillejord, S. (2020). Barriers to Student Active Learning in Higher Education. *Teaching in Higher Education*, 1-19. <https://doi.org/10.1080/13562517.2020.1839746>
- Bryson, C. & Hand, L. (2007). The role of engagement in inspiring teaching and learning. *Innovations in Education and Teaching International*, 44(4), 349–362. <https://doi.org/10.1080/14703290701602748>
- Buchan, L. & Simpson, B. (2020). Projects-as-Practice: A Deweyan Perspective. *Project Management Journal*, 51(1), 38-48. <https://doi.org/10.1177/8756972819891277>

- Candy, L. (2019). *The Creative Reflective Practitioner: Research Through Making and Practice* (1st ed.). Routledge.
- Crawford-Garrett, K. & Thomas, M. (2018). Teacher Education and the Global Impact of Teach For All. *Oxford Research Encyclopedia of Education*. <https://oxfordre.com/education/view/10.1093/acrefore/9780190264093.001.0001/acrefore-9780190264093-e-417>.
- Dorst, K. (2015). *Frame innovation: Create new thinking by design*. MIT Press.
- Dym, C. L., Agogino, A. M., Eris, O., Frey, D. D. & Leifer, L. J. (2019). *Engineering design thinking, teaching, and learning*. Springer.
- Finn, B. (2020). Exploring interactions between motivation and cognition to better shape self-regulated learning. *Journal of Applied Research in Memory and Cognition*, 9(4), 461–467. <https://doi.org/10.1016/j.jarmac.2020.08.008>
- Freire, P. (2017). *Pedagogy of the oppressed* (30th anniversary ed., M. B. Ramos, Trans.). Bloomsbury Academic. (Original work published 1970)
- Gaspari, J. & Visconti, C. (2021). Collaborative learning experiences in a changing environment: Innovative educational approaches in architecture. *Sustainability*, 13(16), Article 8895. <https://doi.org/10.3390/su13168895>
- Hassel, S. & Ridout, N. (2018). An Investigation of First-Year Students' and Lecturers' Expectations of University Education. *Frontiers in psychology*, 8, 2218. <https://doi.org/10.3389/fpsyg.2017.02218>
- Lawson, B. (2006). *How designers think: The design process demystified* (4th ed.). Routledge.
- Love, P. E. D., Matthews, J. & Ika, L. A. (2023). Fast-and-frugal heuristics: an exploration into building an adaptive toolbox to assess the uncertainty of rework. *Production Planning & Control*, 36(3), 251–266. <https://doi.org/10.1080/09537287.2023.2257178>
- Metcalfe, J. (2017). Learning from errors. *Annual Review of Psychology*, 68, 465–489. <https://doi.org/10.1146/annurev-psych-010416-044022>
- Moulder, G., Harris, E. & Santhosh, L. (2022). Teaching the science of uncertainty. *Diagnosis (Berlin, Germany)*, 10(1), 13–18. <https://doi.org/10.1515/dx-2022-0045>
- Neto, S. M. & Fernandes, M. S. (2014). Error as an inventive resource. In *Drawing in the University Today: International Conference on Drawing, Image and Research – Atlas & Vocabulário do Desenho* (pp. 107–112). i2ADS – Universidade do Porto. https://i2ads.up.pt/wp-content/uploads/2018/01/DUT2013_lo.pdf
- Neto, S. M. (2025). Error and blank drawing – From taboo to creative resource [Research proposal]. ResearchGate. <https://doi.org/10.13140/RG.2.2.24624.06408>
- Oxman, R. (2020). Thinking difference: Theories and models of parametric design thinking. *Design Studies*, 52, 4–39. <https://doi.org/10.1016/j.destud.2017.06.001>
- Rubie-Davies, C. M. & Hattie, J. A. (2024). The powerful impact of teacher expectations: a narrative review. *Journal of the Royal Society of New Zealand*, 55(2), 343–371. <https://doi.org/10.1080/03036758.2024.2393296>

- Silberberger, J. (2022), What Can Possibly Go Wrong? Three Examples of Recurrent Deficiencies in the Teaching of Architectural Design. *Int J Art Des Educ*, 41, 214-226. <https://doi.org/10.1111/jade.12409>
- Xu, S. M. & Bogers, M. L. A. M. (2024). Imperfections-as-practice: Projects as becoming processes of imperfections. *Project Management Journal*, 55(2), 123–134. <https://doi.org/10.1177/87569728231216412>
- Zhang, Q. & Fiorella, L. (2022). An integrated model of learning from errors. *Educational Psychologist*, 58(1), 18–34. <https://doi.org/10.1080/00461520.2022.2149525>